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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/872,203	05/31/2001	Yeong-Kwan Kim	2522-11	1930

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EXAMINER

MALDONADO, JULIO J

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 03/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/872,203

Applicant(s)

KIM ET AL.

Examiner

Julio J. Maldonado

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 40 and 41 is/are allowed.
- 6) ☒ Claim(s) 1-10, 12, 13, 16, 19-23, 27-31 and 42 is/are rejected.
- 7) ☒ Claim(s) 11, 14, 15, 17, 18, 24-26 and 32-39 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. The non-final rejection as set forth in paper No. 2 is withdrawn in response to applicants' amendments and response.
2. Claim 42 is newly added.
3. A new rejection is made as set forth in this Office Action.
4. Claims 1-42 are pending in the application.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 3-7, 9, 10, 12, 13, 16, 19-23 and 27-31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 3-7, 9, 10, 12, 13, 16, 19-23 and 27-31 recite the term "predetermined", and the use of "predetermined" reads on a nebulous mental step conducted prior to the manipulative steps of the claimed invention, hence rendering the present process claims unclear in meaning and scope. If applicant wishes to patent detailed controls over the recited process, they must be positively recited.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claim 1, 8 and 42 are rejected under 35 U.S.C. 102(e) as being anticipated by Raajimakers (U.S. 6,511,539 B1).

Raajimakers (Fig.1) in a related method to form a thin layer using atomic layer deposition (ALD) teaches providing a reactor having a single reaction space; concurrently loading a batch of substrates into the single reaction space of the reactor; introducing a gas containing reactants into the single reaction space, and chemically adsorbing a portion of the reactants on top surfaces of the substrates within the single reaction space; and removing non-chemically adsorbed reactants from the single reaction space, wherein said loading comprises transferring the batch of substrate using an automatic wafer transport mechanism, and wherein the single reaction space is not partitioned (column 3, lines 56 – 64 and column 10, lines 48 – 60).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raajimakers ('539 B1) in view of Park (U.S. 2001/0050039 A1).

In reference to claim 2, Raajimakers teaches removing said non-chemically adsorbed reactants from the single reaction space but fail to teach before the removing

step, diluting said non-chemically adsorbed reactants in the single reaction space.

However, Park (Fig.2) in a related method to form a thin film layer using atomic layer deposition teaches diluting non-chemically adsorbed in a single reaction space ([0031]).

Therefore, it would have been obvious to one of ordinary skill in the art at the invention was made to dilute the non-chemically adsorbed reactants as taught by Park prior to remove them from the single reaction space as taught by Raajimakers, since this would prevent the reactive gases from being adsorbed onto the reaction chamber ([0031]).

Allowable Subject Matter

11. Claims 3-7 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter: Raajimakers (Fig.1) in a related method to form a thin layer using atomic layer deposition (ALD) teaches providing a reactor having a single reaction space; concurrently loading a batch of substrates into the single reaction space of the reactor; introducing a gas containing reactants into the single reaction space, and chemically adsorbing a portion of the reactants on top surfaces of the substrates within the single reaction space; and removing non-chemically adsorbed reactants from the single reaction space (column 3, lines 56 – 64 and column 10, lines 48 – 60).

However, Raajimakers neither teaches nor suggests introducing the gas containing reactants at a first predetermined pressure and said diluting is performed to a second predetermined pressure, and where the second predetermined pressure is

greater than the first predetermined pressure; and said introducing gas step containing reactants is performed at a first predetermined pressure, where said removing comprises pumping the reactor, thereby lowering the pressure of the reactor to a third predetermined pressure, and where the third predetermined pressure is lower than the first predetermined pressure.

13. Claims 9-39 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

14. The following is a statement of reasons for the indication of allowable subject matter: Raajimakers (Fig.1) in a related method to form a thin layer using atomic layer deposition (ALD) teaches providing a reactor having a single reaction space; concurrently loading a batch of substrates into the single reaction space of the reactor; introducing a gas containing reactants into the single reaction space, and chemically adsorbing a portion of the reactants on top surfaces of the substrates within the single reaction space; and removing non-chemically adsorbed reactants from the single reaction space (column 3, lines 56 – 64 and column 10, lines 48 – 60).

However, Raajimakers neither teaches nor suggests introducing a gas containing reactants into the reactor at a first predetermined pressure, and chemically adsorbing a portion of the reactants on the substrate surface; and diluting non-chemically adsorbed reactants in the reactor such that the pressure of the reactor is increased to a second predetermined pressure.

Park (Fig.2) in a related method to form thin films by atomic layer deposition teach introducing a gas containing reactants and a diluting gas at a first predetermined

pressure; introducing a second reactant gas at a second predetermined pressure, wherein the second predetermined pressure is lower than the first predetermined pressure; and further introduce the second reactant gas into the reaction chamber at a third predetermined pressure, wherein the third predetermined pressure is greater than the first predetermined pressure.

However, Park fails to teach, introducing a gas containing reactants at a first predetermined pressure; and introducing a diluting gas such that the pressure of the reactor is increased to a second predetermined pressure.

15. Claims 40 and 41 are allowed.

16. The following is a statement of reasons for the indication of allowable subject matter: Raajimakers (Fig.1) in a related method to form a thin layer using atomic layer deposition (ALD) teaches providing a reactor having a single reaction space; concurrently loading a batch of substrates into the single reaction space of the reactor; introducing a gas containing reactants into the single reaction space, and chemically adsorbing a portion of the reactants on top surfaces of the substrates within the single reaction space; and removing non-chemically adsorbed reactants from the single reaction space (column 3, lines 56 – 64 and column 10, lines 48 – 60).

However, Raajimakers neither teaches nor suggests introducing a gas containing reactants into the reactor at a first predetermined pressure, and chemically adsorbing a portion of the reactants on the substrate surface; and diluting non-chemically adsorbed reactants in the reactor such that the pressure of the reactor is increased to a second predetermined pressure.

Park (Fig.2) in a related method to form thin films by atomic layer deposition teach introducing a gas containing reactants and a diluting gas at a first predetermined pressure; introducing a second reactant gas a second predetermined pressure, wherein the second predetermined pressure is lower than the first predetermined pressure; and further introduce the second reactant gas into the reaction chamber at a third predetermined pressure, wherein the third predetermined pressure is greater than the first predetermined pressure.

However, Park fails to teach, introducing a gas containing reactants at a first predetermined pressure; and introducing a diluting gas such that the pressure of the reactor is increased to a second predetermined pressure.

Response to Arguments

17. Applicant's arguments with respect to claims 1-41 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion


18. Papers related to this application may be submitted directly to Art Unit 2823 by facsimile transmission. Papers should be faxed to Art Unit 2823 via the Art Unit 2823 Fax Center located in Crystal Plaza 4, room 3C23. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2823 Fax Center number is **(703) 305-3432**. The Art Unit 2823 Fax Center is to be used only for papers related to Art Unit 2823 applications.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Julio J. Maldonado** at **(703) 306-0098** and between the

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hours of 8:00 AM to 4:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via julio.maldonado@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (703) 306-2794.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Group 2800 Receptionist** at (703) 308-0956.


JMR
3/23/03


George Fourson
Primary Examiner
2823